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COMPOSITIONS COMPRISING 2-HYDROXYCARBOXYLIC ACIDS AND RELATED COMPOUNDS,  
AND METHODS FOR ALLEVIATING SIGNS OF DERMATOLOGICAL AGING
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US 4612331  
EP 0273202  
EP 0413528
- (57) Claim

1. A method for preventing and/or reducing the appearance of skin changes associated with intrinsic and/or extrinsic aging, said skin changes associated with aging resulting from natural or innate aging or exposure to actinic radiation,

whereby said skin changes associated with aging are selected from the group consisting of thinning of the skin, deepening of skin lines, yellowish skin, loss of elasticity, loss of recoilability, and loss of collagen,

said method comprising topically applying to the skin a composition comprising at least one compound selected from the group consisting of 2-hydroxycarboxylic acids, 2-ketoacids and related compounds, or topically effective salts thereof, in an amount and for a period of time sufficient to prevent and/or reduce the appearance of said skin changes associated with intrinsic and/or extrinsic aging.

wherein said 2-hydroxycarboxylic acid is represented by a generic structure of:



wherein  $R_a$  and  $R_b$  may be the same or different and are independently selected from H, F, Cl, Br, alkyl, aralkyl or aryl group of saturated or unsaturated, isomeric or non-isomeric, straight or branched chain or cyclic form, having 1 to 29 carbon atoms, and in addition  $R_a$  and  $R_b$  can be substituted by OH, CHO, COOH and alkoxy group having 1 to 9 carbon atoms, said 2-hydroxycarboxylic acid may be present as a free acid or lactone form, or in a salt form with an organic base or an inorganic alkali, and as stereoisomers as D, L, and DL forms when  $R_a$  and  $R_b$  are not identical,

said 2-ketoacid is represented by a generic structure of:



wherein  $R_c$  and  $R_d$  may be the same or different and are independently selected from H, alkyl, aralkyl or aryl group of saturated or unsaturated, isomeric or non-isomeric, straight or branched chain or cyclic form, having 1 to 29 carbon atoms, and in addition  $R_c$  may carry F, Cl, Br, I, OH, CHO, COOH and alkoxy group having 1 to 9 carbon atoms, said alpha ketoacid existing as a free acid or an ester form, or in a salt form with an organic base or an inorganic alkali, and

said related compound is selected from the group consisting of ascorbic acid, quinic acid, isocitric acid, tropic acid, trethocanic acid, 3-chlorolactic acid, cerebronic acid, citramalic acid, agaricic acid, aleuritic acid, pantoic acid, lactobionic acid and hexulosonic acid,

and wherein a pseudoamphoteric or amphoteric agent is not present in the composition.